

Unit 4.5 - Counting Principles - Day 1

Section 8.6

Fundamental Counting Principle

FUNDAMENTAL COUNTING PRINCIPLE

If n independent events occur, with
 m_1 ways for event 1 to occur.
 m_2 ways for event 2 to occur.

.

.

.

and m_n ways for event n to occur.
then there are $m_1 \cdot m_2 \cdot \dots \cdot m_n$

different ways for all n events to occur.

Using the Fundamental Principal of Counting

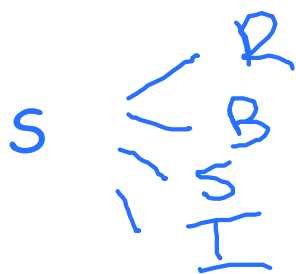
Counting Theory Handout

Composition of Cover: smooth, crinkled.

Lettering Style: Roman, block, script, italic

How many different choices are there?

$$4 \cdot 2 = 8$$



Fundamental Counting Principle:

$$2 \times 4 = 8$$

Handout Example #1

A new economy car has just come on the market. To keep the price low, the manufacturer offers only the following options:

COLOR	ENGINE	TRANS.	RADIO
white	4 cylinders	manual	stereo, 4
red	6 cylinders	automatic	stereo, 8
blue			ster/cass, 4
			ster/cass, 8

How many different choices are there? $3 \cdot 2 \cdot 2 \cdot 4 = 48$



Suppose a student id number consists of 6 digits and the first digit can not be 0. How many student numbers can be made?

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$$9 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 = 900,000 \text{ Poss. Id\#}$$

Suppose a student id number consists of 6 digits and the first digit can not be 0. No digits may repeat. How many student numbers can be made?

$$\underline{9} \cdot \underline{9} \cdot \underline{8} \cdot \underline{7} \cdot \underline{6} \cdot \underline{5} = 136,080 \text{ Possibilities}$$

Suppose a student id number consists of 6 ^{digits}. The first digit can not be 0. All other digits must be even. How many arrangements?

9 . 5 . 5 . 5 . 5 . 5 28,125 ways

No Repeats ³ in the last 5 digits?

9 . 5 . 4 . 3 . 2 . 1

Homework

Counting Principles

Day 1

p 620-621: 7-12, 23-30